

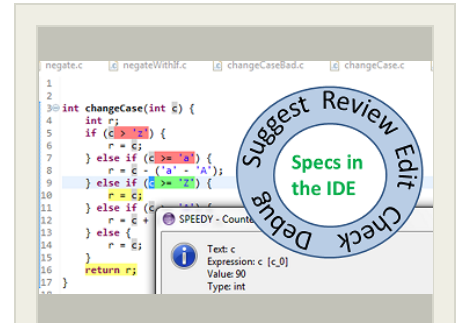
## Specification Editing and Discovery Assistant, Phase II

Completed Technology Project (2014 - 2016)



## Project Introduction

Accurate safety analysis of software suffers from a lack of appropriate tools for software developers. Current automated tools require approximate analyses; fully-assured verification with formal methods is expert-intensive. A key to improvement is machine-checkable specifications for software modules. Specifications are also needed to express the intent of software. Further, to scale to wide use, engineers who are not formal methods experts must have usable tools, as automated as possible, integrated into their usual software development environments (IDEs). Our proposal, SPEEDY, is a user experience (UX) design for convenient generation, manipulation, and checking of specifications, directly in a common IDE (Eclipse). The tool's design integrates automated specification suggestion using current tools and published techniques. The tool also enables checking and debugging specifications directly in the IDE, with information presented in the context of the source code. The proposal targets C/C++ programs, particularly for embedded software development. Phase I of SPEEDY assessed current specification languages and prototyped the key UX mechanisms: we are now confident that they can be implemented in the Eclipse IDE. We also integrated several analysis tools, demonstrating that SPEEDY can obtain specification suggestions from external sources. We assessed many specification suggestion algorithms, selecting some to be implemented and evaluated on realistic software in Phase II. Phase I also prototyped the integrating specification checking tools and specification debugging features. We demonstrated SPEEDY on NASA software from the NASA open software site. The Phase II proposal presents a plan for scaling up the successful Phase I prototype in many dimensions: more language features; more sophisticated user guidance in generating and debugging specifications; more specification suggestion algorithms; scaled up to realistic program size.



Specification Editing and Discovery Assistant, Phase II

## Table of Contents

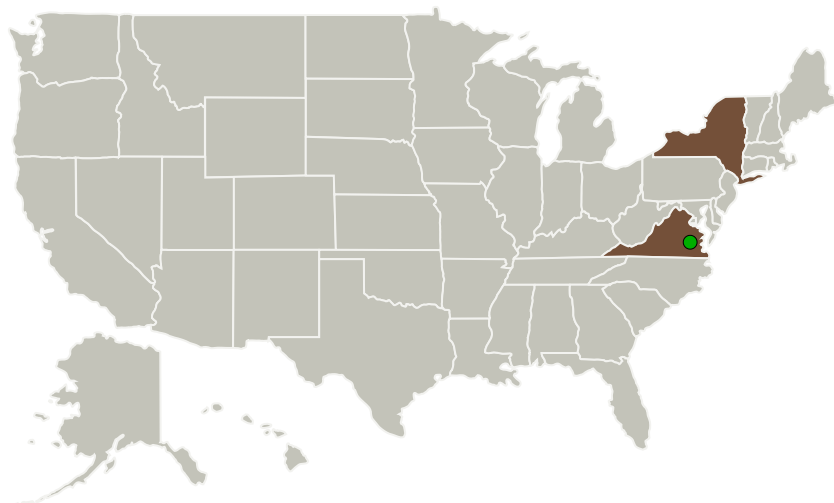
Project Introduction	1
Primary U.S. Work Locations and Key Partners	2
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Images	3
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

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## Primary U.S. Work Locations and Key Partners




Organizations Performing Work	Role	Type	Location
GammaTech, Inc.	Lead Organization	Industry	Ithaca, New York
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

## Primary U.S. Work Locations

New York	Virginia
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## Project Transitions

 **April 2014:** Project Start **April 2016:** Closed out**Closeout Summary:** Specification Editing and Discovery Assistant, Phase II Project Image**Closeout Documentation:**

- Final Summary Chart Image(<https://techport.nasa.gov/file/137471>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

GammaTech, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

David Cok

**Co-Investigator:**

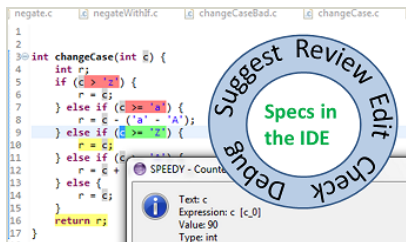
David Cok

# Specification Editing and Discovery Assistant, Phase II

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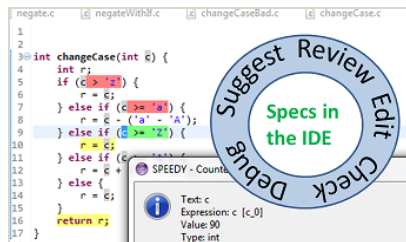


## Images



### Briefing Chart Image

Specification Editing and Discovery Assistant, Phase II  
(<https://techport.nasa.gov/image/129778>)

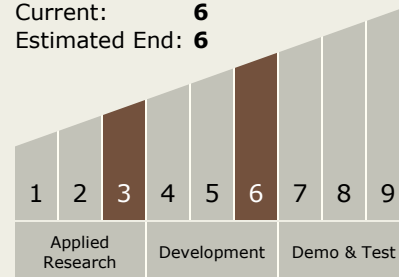


### Final Summary Chart Image

Specification Editing and Discovery Assistant, Phase II Project Image  
(<https://techport.nasa.gov/image/135772>)

## Technology Maturity (TRL)

Start: **3**  
Current: **6**  
Estimated End: **6**



## Technology Areas

### Primary:

- TX04 Robotic Systems
  - TX04.6 Robotics Integration
    - TX04.6.3 Robot Software

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System